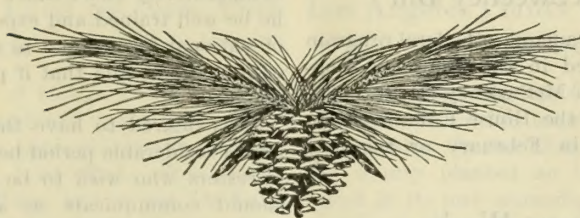


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FOREST WORKER



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Announcements

Hearings on McSweeney Bill

Hearings on the bill for an adequate Federal program of forest research introduced in the House of Representatives by Congressman McSweeney (H. R. 6091) are expected to be held by the House Committee on Agriculture the last week in February or the first week in March.

American Forest Week

American Forest Week of 1928 will be observed April 22-28. The American Forest Week Committee this year is headed by Theodore Roosevelt as chairman, and has as the chairman of its executive committee Ovid M. Butler, secretary of the American Forestry Association.

Southern Forestry Congress

The Tenth Southern Forestry Congress will be held in Louisville, Ky., February 14 and 15, 1928.

Haiti Wants a Forester

The director general of the technical service of the Department of Agriculture, Republic of Haiti, has asked the Chief of the United States Forest Service to recommend men suitable for appointment as director of forestry of Haiti. It is expected that the position will be open within the next six or seven months. A forestry appropriation of \$35,000 for the current year permits the offer of a salary of \$5,500. Requirements are stated by the director general as follows: "While we should prefer to have a man experienced in tropical botany and forestry, these are not of primary importance, because a man well grounded in botany will make himself acquainted with our forest trees in a

comparatively short time. It is more important that he be well trained and experienced in the organization of national forests and in the administration of these organizations, and that if possible he be able to speak French."

It is desired to have the new man on the ground for a considerable period before he takes over the work. Foresters who wish to be considered for the position should communicate as soon as possible with the Forester, United States Forest Service, Washington, D. C.

Meeting to Revive the International Union of Forest Experiment Stations

The international congress contemplated for the purpose of reviving the International Union of Forest Experiment Stations is now being planned for the summer of 1929. The Swedish Government has been asked by the board of the national college of forestry and the State Institute for Forest Research to appropriate 26,000 crowns to cover the expenses of the meeting. It is intended that the members of the congress should meet in Malmö and spend a week in excursions to experimental forest grounds of southern and central Sweden. Another week or less would be devoted to the congress, in Stockholm, probably at the college of forestry. A trip through northern Sweden to visit experimental forests and other forest grounds there would be arranged for delegates wishing it. An attendance of about 100 is expected.

National Four-H Camp

A second national camp of Four-H Club boys and girls will be held in Washington, D. C., in June, 1928, under the auspices of the Department of Agriculture.

Because the free edition of this periodical is necessarily limited, it can be distributed without charge outside of the Government service only to such persons and organizations as State forestry and conservation officials, State agricultural extension directors, faculties and libraries of forest schools, and forestry associations. Others desiring to obtain copies of the Forest Worker can do so by sending 5 cents for a single copy or 25 cents for a year's subscription to the Superintendent of Documents, Government Printing Office, Washington, D. C. Foreign subscriptions: Yearly, 35 cents; single copies, 7 cents.

Material offered for publication in the Forest Worker should be addressed to the Editor, United States Forest Service, Washington, D. C.

FOREST WORKER

Washington, D. C.

JANUARY, 1928

Vol. 4, No. 1

State Forestry

Purchases of Forest Land by New York State

Purchase of 6,035 acres of high mountain land in Essex County, N. Y., for addition to the Adirondack forest preserve, was recently approved by the board of commissioners of the State land office. The land is situated southeast of Mt. Marcy and on the Elk Lake watershed, intermingled with lands already owned by the State. The greater part of it lies on the upper slopes of nine mountains, Marcy, Skylight, Redfield, Allen, Grey Peak, Cliff, Dix, Macomb, and Marshall, all of which are more than 4,000 feet in height. When this purchase has been completed the State will own all the slopes of these mountains, with the exception of a private park on Dix. The area includes Lake Tear-of-the-Clouds, the major portions of Feldspar and Uphill Brooks, and other upper sources of the Opalescent, Ausable, and Hudson Rivers. A considerable portion of it is forested with a heavy stand of virgin softwood timber which the owners were planning to cut in the immediate future. Important watershed protection and recreational values are thus involved in this purchase which, since it will round out present State holdings, is desirable also for administrative reasons.

The addition of 41,243 acres to the State forest preserves of New York during the year 1927 has brought their total area to 2,078,994 acres. The year's purchases exhausted the remainder of the funds from the \$7,500,000 bond issue made available by the referendum of 1916. The conservation department reports that these funds were expended as follows:

Purchase of land (293,822.05 acres)	\$6,524,162.60
Purchase of underlying titles to 41,440 acres	250,400.00
Expenses of department of law	380,836.95
Expenses of conservation department	324,791.31
Expenses of comptroller's office (printing bonds, etc.) ..	19,808.94
	<hr/> 7,500,000.00

The village of Warsaw, N. Y., has purchased a tract of 40 acres as an addition to the municipal forest on which in the past four years it has planted 115,500 trees.

Los Angeles Plants Trees on Burned-over Watersheds

Los Angeles County, Calif., has done another big year's work for the improvement of its burned-over watersheds. In the 12 months ending June 30, 1927, the county planted on the watersheds 72,719 trees raised in its own nurseries, and sowed on them 1,935 pounds of clean tree seed and 7,210 pounds of clean brush seed. In addition it furnished 50,000 Coulter pine seedlings to be planted by the California Forest Experiment Station in the Devil's Canyon nursery, near San Bernardino, and eventually to be used in watershed reforestation. Under a new ruling of the county board of supervisors 15,075 2-year-old Coulter pines were distributed without charge to private individuals and organizations for planting within major watershed areas of the county.

Nearly 2,000 trees were used by the county foresters during 1927 in roadside planting.

Trees raised by the county may now be sold at 1 cent apiece for planting outside the county, or for planting within the county on private lands not included in major watersheds. Under this provision 35,850 trees were sold during the year, all but 2,200 of them for use outside the county.

Seedlings and transplants that were growing in the county nurseries, at Altadena and Grizzley Flats, during the year included 679,948 conifers, of which 531,061 were Coulter pine and 103,324 were big cone spruce, and 16,055 hardwoods.

Early in the year the county entered on an agreement with the Federal Government for cooperation in the work of the newly established California Forest Experiment Station. The county foresters are now cooperating with those of the station in a study of methods of establishing a cover on denuded watersheds, and in a study of erosion at the Devil's Canyon branch station.

Los Angeles County has appropriated about \$1,250,000 for the work of the county forestry department during the present fiscal year, of which amount about \$396,000 is available for fire prevention and suppression in brush and timbered areas.

Fire Protection District Created in Mississippi

The 18-months-old Mississippi Forestry Department has already created a forest fire protection district embracing 500,000 acres of cut-over land. The district lies in the southeastern part of the State, west of the Pascagoula River. The forest type is longleaf and slash pine. In the past, fires have burned over something like 80 per cent of this area every year. Under the present plan the owners pay 3 cents per acre annually for fire protection and the State, with Federal funds allotted under the Clarke-McNary law, is putting up 2 cents per acre per year. District Forester K. E. Kimball is in charge.

The plan calls for five, or perhaps six, steel observation towers. One tower was erected on the area several years ago by the Southern Paper Co., and a new steel tower, 90 feet high, has been completed recently. Thirty-seven miles of telephone line have been completed.

New Michigan Park Contains Virgin White Pine

The sixtieth and largest of Michigan's State parks has been presented by Mrs. Karen Hartwick, of Ann Arbor, as a memorial to her husband, Edward E. Hartwick, and her father, Nels Michelson. It is an 8,236-acre tract near Grayling, Mich., including 85 acres of virgin white pine said to be the only stand of this timber left in the lower peninsula. It will be known as the Edward E. Hartwick Pines Park. The State will reforest the cut-over portions and will build a lodge in which to exhibit relics of the old lumbering days. The Sallin Hansom Co. sold the tract to Mrs. Hartwick for \$50,000.



A bill (H. R. 42) introduced in the House of Representatives on December 5 by Mr. Free would amend section 4 of the Clarke-McNary law so as to permit cooperation with States in growing forest trees and distributing them to all classes of landowners, instead of to farmers only as under the present provision. A companion bill has been introduced in the Senate by Senator Oddie.



The part of the Clarke-McNary cooperative work of the Federal Government with Southern States that was heretofore handled by the district forester of the eastern national forest district has been transferred to the branch of public relations in the office of the Forester in Washington. The States affected by this change are Virginia, West Virginia, Kentucky, Tennessee, North Carolina, South Carolina, Georgia, and Florida. The change became effective December 1.

Some Notes from Louisiana State Nursery

In the Louisiana State Forest Nursery, near Alexandria, La., seed of longleaf pine were sown this fall as soon as possible after extraction. It has been observed that seedlings from fall sowings are more resistant to the red-spot fungus than those from seed sown in the spring. The longleaf stock from the spring sowings of 1926 and 1927 became badly infected with the red spot, so that by the middle of October most of the leaves were dead. A new growth of leaves in November, however, gave a full green color to all the beds. It is the opinion of Henry Hardtner, of Urania, and L. I. Barrett, of the Southern Forest Experiment Station, that longleaf seedlings will sustain repeated yearly attacks of the red spot without much loss by death.

The tip moth, which played havoc in 1927 with loblolly and shortleaf pine in many parts of the South, including central Georgia, only slightly attacked the seedlings in the Louisiana nursery beds.

Experimental plantings have been made by C. F. Delaney, State forest custodian in charge of the nursery, with seeds of certain longleaf trees that produce very large cones bearing seeds with small light-brown wings instead of the large dark-brown wings. These trees, Mr. Delaney has observed, produce wood with a relatively uniform soft texture, or with very narrow bands of summer wood. Another strain now being tested is the hybrid of longleaf and loblolly known as the Sonderegger pine, which is said to resemble the longleaf in appearance during youth but to grow at a much more rapid rate.

Among the hardwoods sown in the Louisiana nursery this fall are white and green ash, white oak, and black walnut. Next spring a large sowing of shortleaf, loblolly, and slash pine will be made, as well as smaller sowings of cypress, catalpa, and black locust.

In the season of 1927 cypress in this nursery grew to an average height of about 3½ feet and to a maximum of 5 feet.

Sulphuric Acid to Keep Out the Weeds

Sulphuric acid as a preventive of the growth of weeds has been used successfully by F. H. Claridge in the State forest nursery at the North Carolina State Agricultural College, Raleigh, N. C. Mr. Claridge used three-sixteenths ounce of commercial sulphuric acid (57 per cent), diluted with 1 pint of water, to each square foot of nursery bed. The seed, principally of loblolly, longleaf, shortleaf, and slash pine, were placed in the seed beds and covered lightly with sand, and the diluted acid was applied immediately by means of a watering can.

Railroad Fires Decrease in New York

● Smokers' fires made up 38 per cent of the 868 forest fires recorded in New York State in 1927, and covered 50 per cent of the area burned, Conservation Commissioner McDonald reports. Railroads were responsible for 14 per cent of the fires and for 20 per cent of the area burned. Brush burning caused 7 per cent of the fires, and fishermen and land-clearing fires about 6 per cent each. The fact that the number of fires caused by railroads decreased, at the same time that fires from other important causes showed increases, is credited to closer inspection of locomotives and improved maintenance in all fire-protective devices on locomotives.

Nebraska Homestead Plantation Becomes a State Park

A piece of a Nebraska homestead that was planted with trees 65 years ago has been dedicated as the Stolley State Park. It was in 1857 that William Stolley migrated from the East to settle on this land. Mr. Stolley had learned forestry in Germany, and he lost no time in starting a forest plantation. He set out 6,000 trees in 1861, and continued until he had planted 20 acres. On a second tract of 20 acres he developed a sort of arboretum, with forest and ornamental trees of many species. The portion of the homestead containing these trees has been purchased at a cost of about \$30,000 with funds raised through the activities of the Grand Island Chamber of Commerce, and was deeded to the State in October, 1927, as the fourth unit in Nebraska's system of State parks.

Lookout Towers for North Carolina Forests

With 10,000,000 acres of forest land under organized protection, the State of North Carolina plans a system of 55 lookout towers. Eight towers and two mountain tops were manned this fall by the State forestry division in cooperation with counties and individuals and, in the case of the stone tower on Mount Mitchell, with the Federal Government. Those in use for the first time were a 60-foot steel tower on Palestine Hill, 10 miles north of Fayetteville, in Cumberland County, and a 35-foot steel tower on Hibriten Mountain near Lenoir, in Caldwell County. A new 30-foot steel tower on Hightop Mountain, near Asheville, will be manned in the near future, and three wooden towers are under construction this winter.

Farmers of west Tennessee have made arrangements to plant 100,000 black locust seedlings on waste and gullied lands this coming spring. The seedlings will be furnished by the State forestry division, which is directing the reclamation effort.

Sportsmen's Reforestation Cup Awarded

The silver reforestation cup given to the sportsmen's clubs of New York State by James S. Whipple, formerly commissioner of the State conservation commission, was awarded for 1927 to the Shawangunk Fish and Game Association of Orange and Sullivan Counties. During the past year this club was responsible for the planting of 603,000 trees. The closest contenders were the Cortland County Sportsmen's Association, with a score of 406,000 trees, and the Orange Lake Fish and Game Association, Newburg, with 46,000. Four other clubs had to their credit the planting of from 6,000 to 20,000 trees.

The supervisors of Erie County, N. Y., have voted an appropriation of \$55,000 for purchasing and reforesting idle farm lands. Of this sum \$15,000 will be available in 1928 and \$10,000 in each of the four succeeding years. Trees for planting will be furnished without charge by the State.

The Wisconsin Conservation Commission has announced that the State forest nursery is to be enlarged at once to twice its present capacity. The board also plans to bring the nursery's capacity to 10,000,000 plants within the next three years and to 20,000,000 within the next five years.

Applications for registration of land under the State forest crop act received by the commission up to November 28 represent about 100,000 acres.

The Hearthstone Point camp site, on the west shore of Lake George, which the New York Conservation Commission opened to the public in 1927, is to be enlarged through the purchase of a 35-acre tract adjoining it on the north. This will add 800 feet to the camp ground's frontage on the lake and also on both sides of the Lake George-Bolton highway. An elaborate system of roads constructed by a former owner minimizes the expense of preparing the area for the use of campers.

Additions by purchase to the State forests of New Jersey during the fiscal year 1927 totaled 2,019 acres. The sum of \$111,496 is available for forest acquisition by the State during the present fiscal year.

A five-minute talk dealing with the forest resources of Virginia will be broadcast from radio station WRVA, Richmond, Va., at 8 p. m. on the last Thursday of every month during the winter and spring. The State forester and members of his staff will speak.

Education and Extension

New Four-Year Forestry Course at Utah College

A four-year course in forestry is being started by the school of agriculture of the Utah Agricultural College at the beginning of this year's winter quarter. The course offers opportunity for specializing in range management in the senior year. Provision is made for a six weeks' summer camp between the sophomore and junior years.

Yale to Get African, Nicaraguan, and Peruvian Wood Specimens

Specimens of African forest species are to be added to the Yale Forest School collection of tropical woods, which now includes more than 11,000 specimens. The Firestone Plantations Co. has agreed to collect them for the school in the areas it is clearing for rubber cultivation in Liberia. Additions to the collection from tropical America are expected to result from arrangements that have been completed with lumber companies in Nicaragua and Peru. Collectors for the school are still at work in Honduras, Guatemala, and British Honduras. One of their recent discoveries identifies the Honduras rosewood, used in this country for the bars of xylophones and marimbas, as a species of Dalbergia. In honor of Neil S. Stevenson, assistant conservator of forests of British Honduras, Dr. Paul C. Standley has given the tree the name *Dalbergia Stevensonii*.

Yale Offers Ph. D. in Forestry

Yale University has announced that in future it will offer the degree of doctor of philosophy in forestry. Until the present time foresters desiring to obtain the doctor's degree from Yale have been registered in the department of botany in the graduate school, even if their work was almost entirely under the faculty of the school of forestry.

In the present school year six foresters are enrolled in Yale as candidates for the doctor's degree.

A course in the principles of forest entomology is now required of students of forestry and logging engineering in the Oregon Agricultural College. In addition to this introductory course the school offers three regular elective courses in forest entomology and other work in forest insect problems.

Washington De Molays Establish Forest Plantation

Boys of the Order of De Molay in the State of Washington have just made themselves members of the world order of tree planters. The 33 chapters in the State have joined in providing funds for the establishment of a forest plantation on the Columbia National Forest, and the first planting of 57,000 Douglas fir trees went into the ground this fall. The site lies about 15 miles north of Carson, Wash., on the Evergreen Highway. This planting, which is to be repeated on adjoining land in succeeding years, represents the "special patriotic and civic service" of the State organization for 1927, and the boys look forward to the time when De Molays of both Washington and Oregon will find the Washington De Molay Forest an ideal camp ground.

The cut-over area thus to be reforested was selected by J. F. Kummel, chief of planting of the North Pacific National Forest District. The trees were brought from the Wind River Forest Nursery, and the actual planting was done by a crew of 12 experienced men under the direction of G. A. Bright, technical assistant on the Columbia National Forest. The expense to the De Molays was \$769.

Louisiana Puts Forestry in Boy Scout Camps

The Louisiana Division of Forestry had representatives at practically all the Boy Scout camps of the State in the past summer. At Camp Salmen, near Slidell, about 500 scouts got a taste of forestry during visits of two weeks or more. W. B. Wheelis, a forestry graduate of the Louisiana State University, was the teacher at this camp. Forestry talks and hikes were supplemented with visits to the operations of the Great Southern Lumber Co. and to turpentine orchards. The boys practiced what they had learned of the care of woodlands in improving a plot of loblolly and slash pine, and before leaving camp nearly every scout won an emblem by identifying 10 trees and naming their uses.

Four-H Forestry Clubs of North Dakota are learning to identify trees in winter, through instructions prepared for them by Extension Forester Gillett. All the native and many introduced species are covered by Mr. Gillett's instructions, which include diagrams and a key.

Arnold Arboretum Endowment Fund

About \$600,000 has been raised toward the \$1,000,000 endowment fund for the Arnold Arboretum of Harvard University, projected as a memorial to Charles Sprague Sargent, late director of the arboretum. On December 3, \$109,250 had been received from New York contributors. Edward S. Harkness has offered a gift of \$50,000 on condition that the New York committee match the \$460,000 already contributed in Boston.

Purdue Summer Forestry Camp

The forestry department recently organized in Purdue University, LaFayette, Ind., will hold its first forestry camp during the coming summer on the 5,000-acre State forest at Henryville, Clarke County, Ind. Here the students will have the opportunity to study 500 acres of softwood and hardwood plantations, some of which are nearly 30 years old, and to observe experiments in managing forest plots of farm woodland size on a sustained-yield basis.

Woodsmen's Short Course at Madison a Success

The woodsmen's short course given recently at the University of Wisconsin attracted 16 men, mostly men actually engaged in woods operations who were sent at the expense of the lumber and paper companies that employed them. Others included in the enrollment were 4 rangers detailed by the Wisconsin Conservation Commission, 1 civil engineer and pulp contractor, and 1 timber owner.

The classroom work, which was conducted as a seminar, soon developed into exchange of experience and test of new ideas on such subjects as clear cutting versus selective logging, marking timber in selective logging, the effect of the new forest tax law on selective cutting, how to increase the value of the product by proper cutting of the trees into logs, grades available from logs and trees of different sizes, slash disposal, fire protection, effect of change from clear cutting to selective logging on the construction of logging railroads, advisability of planting, and costs and returns of planting. Some of the discussions were led by operators actually engaged in selective logging in the Lake States. The plan of spending a week at the university in classroom and laboratory work and a week in the woods as outlined in the Forest Worker for November was followed out. The students were taken to the operations of the Holt and Goodman lumber companies, where they were entertained and shown the methods and results of selective logging as carried on by the two companies.

The students expressed their interest and satisfaction by not missing a single discussion, by many practical

contributions from their experience, and by a resolution addressed to the university asking that the course be repeated with some additions to the subject matter.

Campaign to Halt Clear Cutting of Arkansas Pine for Pulpwood

William K. Williams, extension forester of Arkansas, is concentrating this winter on an effort to stem the tide of clear cutting of pine timber for pulpwood in the southern part of the State. In this region the cutting of every tree that will make a 3-inch stick of pulpwood is an old and extremely persistent habit. In addition to the two pulp and paper mills now drawing supplies of timber from southern Arkansas one is to be opened in February in Camden. Mr. Williams has the cooperation of county agents and leading business men in holding meetings in school-houses and churches, and in distributing posters, leaflets, and press articles.

Forest Work for New York Scouts

A forested camp ground of 10,200 acres in the town of Tusten, Sullivan County, N. Y., is being acquired by the Boy Scout Foundation of the city of New York. The tract borders the Delaware River for nearly 2 miles between Barryville and Narrowsburgh. The work of cleaning the forest growth now on it and of reforesting certain sections will for the most part be done by the scouts themselves. First of all, the area is to be surrounded with a 15-foot fire line.

Maryland Four-H Boys Climb for Cones

Seventeen Maryland boys, members of the Hoopers' Island and Crapo Four-H Clubs, did a good turn for the State department of forestry this fall by climbing loblolly pine trees for cones. The boys collected 145 of the 600 bushels of loblolly pine cones from which the department will extract seed for nursery planting in 1928 and 1929. One boy, John Burton, alone collected 44 bushels.

Scouts to Grow and Plant Their Own Trees

Boy Scouts of Richmond, Va., are going to raise pine trees from the seed to reforest their camp ground in Chesterfield County, about 100 acres of which was burned over in 1926. A small forest nursery is being started at the camp, and sowings will be made of each of the principal species of southern pine. Ten bushels of loblolly pine cones have been donated by P. Ryland Camp, of Franklin, Va. The boys will do all the work of caring for the nursery and planting the trees, under the direction of Field Executive N. M. Pollock and of A. B. Partee, caretaker of the camp.

Forest Service Notes

Lightning Fire Warnings

By H. T. GISBORNE, United States Forest Service

The successful control of lightning fires is one of the most baffling problems confronting forest owners in the United States. The records for the part of the forest area that is protected against fire show that during the year 1926 lightning fires did more damage, 31 per cent of the total, than fires from any other cause. By numbers they amounted to only 12 per cent of the total.

Surprising as are these figures for the country as a whole, the records for the northern Rocky Mountain region are even more startling. In Idaho and Montana, during the year 1926, lightning caused 59 per cent of all the forest fires and did 72 per cent of the total damage, in spite of the fact that in these States practically all the forest land is given what is at present considered rather intensive protection. The explanation seems to lie in the fact that the peculiarities of lightning and lightning-caused forest fires are little understood.

Since 1920 more and more scientific investigation has been devoted to the problem of lightning-caused fires, especially in California and the northern Rockies. The method of attack has been the recording and analysis of facts concerning the occurrence, characteristics, and effects of lightning storms. On the higher mountain tops, in these regions, men are stationed throughout the period of fire danger to detect, locate, and report forest fires. The lookouts obviously are well situated also to obtain and report essential information concerning lightning storms. Since 1922 this information has been recorded annually on specially prepared report forms and the mass of more than 5,000 storm observations, covering five fire seasons, has been analyzed under the supervision of the Northern Rocky Mountain Forest Experiment Station. This investigation has taught us the following facts which can be used in improving forest protection in the northern Rockies.

The period of danger from lightning is usually confined to the 122 days between June 1 and September 30. During this period extra protection in the form of lookouts, smoke chasers, etc., must be on the ground prepared to go into action on a few hours' notice. The danger is not evenly distributed throughout the period, but occurs in waves or peaks, which usually occupy a total of about 15 days. The protective organization, therefore, is called on for the suppression of lightning fires during only 12 per cent of the period of employment. This means that the men can be used for other

work such as constructing roads, trails, and telephone lines, and for fighting fires from other causes, during 107 days of their employment.

The analysis of the lookout reports indicates that the condition causing the storms often progresses easterly across the region, and that warnings based on recognition of the cause may be used to good advantage. Single storms have seldom been found to travel more than 60 or 80 miles as an uninterrupted unit. Often the storm ceases to emit lightning after covering a narrow path only 10 or 20 miles long. Only two localities have yet been found where storms seem to follow a certain well-defined path, and neither of these is long enough to permit the useful telegraphing of warnings ahead of the storms.

The records show very clearly that the chance of lightning fires is not, as had been thought, in constant proportion to the number of thunderstorm days. For instance, in western Montana only one lightning storm out of ten is a fire starter, whereas in northern Idaho, during the past few years, one storm out of every two has been productive of fires. Hence, even though storms may be forecast accurately by the Weather Bureau, the occurrence of lightning fires can not be predicated solely on the occurrence of storms.

Practical experience long ago led to recognition of the fact that the so-called "dry storms" are the most dangerous, but thus far no dependable definition has been available to indicate how much rainfall distinguishes a wet from a dry storm. The lookout reports furnish data on this point which appear to be very usable. For instance, the average lightning storm in this region brings a total of about 45 minutes of rain before and after the lightning. (The amount of this rain was not determined in inches because the lookouts must report on many storms that are at a distance from them; in fact, only 47 per cent of the storms during the years 1924, 1925, and 1926 passed directly over any of the 170 lookouts in this region.) Departures from this 45-minute average if correlated with the occurrence of fires should be significant in rating the degree of danger in a storm even before fires have had time to smoke enough to permit detection.

When the data on fire-starting storms, based on more than 3,000 usable reports, were separated from those pertaining only to the storms that did not start fires, it was found that the average safe storm brought a total of about 50 minutes of rain before and after the lightning, whereas the average fire-starting storm brought only 39 minutes of rain. This difference, although not great, indicates that one characteristic of the danger in lightning storms is the duration of the

rain before and after the lightning. The greater the excess of rain above the average, the less the danger; the greater the deficiency, the greater the danger. This knowledge is easily applicable in improving forest protection, because lookouts can time the rainfall and report the departures to the fire-fighting organization usually hours before many of the fires begin to smoke up.

Another characteristic of lightning storms that can be observed and used in estimating the number of the resultant fires is the percentage of lightning strikes. In the northern Rockies, when more than 60 per cent of the lightning flashes are from the clouds to the ground the storm is usually a fire starter. If, on the other hand, less than 40 per cent strike the ground, then the storm is apt to be of the non-fire-starting type. Here again the lookouts are able to determine the fact of interest and to report it to the smoke chasers or rangers often hours before the majority of the fires appear.

The period of time available for warnings has been found by this study to be much greater than practical experience alone had previously indicated. Even if a storm is so local that it is not forecasted by the Weather Bureau, its first actual appearance may be used as a warning hours in advance of the discovery of fires resulting from it. Usually each lookout will discover several fires after each "dry" storm, and these may be grouped into first discoveries, second discoveries, third, fourth, etc., according as the lookout reports one, two, three, or four fires. The analysis of the reports shows that 44 per cent of the first discoveries are not made until five hours or more after the storm has first appeared. If the storm's appearance is reported immediately to the rangers this period of five hours can, of course, be used very advantageously to move men and prepare for fire suppression. At the end of this five-hour period 49 per cent of the second discoveries, 54 per cent of the third, and 59 per cent of the fourth are still to be expected. In fact, 9 per cent of all the fires usually do not show up until 48 or more hours after the storm is first sighted. Such a warning of impending danger obviously can be used to great advantage.

There are, of course, occasional exceptions to the above statements. It is probable, also, that factors other than those mentioned are of considerable importance in determining the number of fires to be expected from lightning storms in the northern Rockies. Some of these factors, such as the moisture content and the consequent inflammability of different timber types before the storms occur, are being studied by the Northern Rocky Mountain Forest Experiment Station.

The most important fact so far brought out by this investigation is that the mere appearance of a lightning storm, if reported immediately, serves as a very appreciable warning of impending danger. The warning can then be localized and the degree of danger can be estimated with very usable accuracy if the path and characteristics of the storm are noted by the lookouts

and reported to the fire-fighting organization. On the basis of these warnings, and the 36-hour forecasts by the Weather Bureau, men can be removed from other work and held in readiness to reach and suppress fires with the least possible delay. In the northern Rocky Mountains to-day the forest protective organization is beginning to take action sometimes even a day before the storms appear and very often immediately after the first report of a storm's appearance. As this preparatory action becomes even more common and more clearly defined a marked lowering of the damage caused by lightning fires is certain to result.

Air Chambers for Steam Fire Pumps

By GEORGE L. DRAKE, United States Forest Service

Experience has shown that the general-service steam pumps with which most donkeys and locomotives are equipped cause a throbbing of the hose lines, due to the impulses of the water being discharged from the pump. This throbbing is most pronounced in the length nearest the pump and results in the blowing off of fittings and the chafing through of the hose where it passes over sharp objects. Fires have escaped control by the failure of the water supply from this cause. The use of heavy steam or air hose on the length next to the pump, and double-strength hose for the next length, has tended to remedy this trouble.

Ranger L. D. Blodgett, of the Olympic National Forest, has found a cheaper and more permanent way of overcoming this throbbing by installing an air chamber in the discharge line. This device can be made by a camp blacksmith or machinist at slight cost. A homemade air chamber that has been found to work successfully on the 3 by 2 by 3 and 4½ by 3 by 4 pumps commonly in use is made by installing a T in the discharge line and fitting to this by a nipple and reducer, or a welded plate, a section of larger pipe with a cap or solid welded plate on the other end, which acts as an air chamber. Where a 4-inch pipe is reduced to a 1-inch T, 4 to 2 and 2 to 1 reducers are necessary. For pumps of 1-inch discharge the air chamber should be made at least 4 by 10 inches, and for pumps of 1½-inch discharge not less than 4 by 14 inches. The air chamber can be placed between the pump and hose connection where most convenient; all that is necessary is that it be set in an upright position and be air tight. If there is the slightest leak in the top of the chamber, it is useless.

An air chamber of this type installed on a 3-cylinder geared pump exploded last winter and injured the pump man. The discharge line had frozen up, and with the high pressure developed by the pump some part had to give way. On pumps of this type it would seem advisable to install a safety valve to avoid such accidents. Where air chambers are used on steam pumps to which hose lines are attached there is no danger, as the hose line would burst before any part of the pump or air chamber.

Do Understocked Stands Ever Catch Up?

By DONALD BRUCE, United States Forest Service

Many investigators have been struggling to determine at what rate understocked stands approach normality. The problem seems almost insoluble except through repeated measurements of permanent sample plots over long periods of years. In view of the effort that is now being expended on such measurements in this country it seems pertinent to challenge the assumption underlying this work. Is there any definite evidence that understocked plots do approach normality? It seems reasonable that they should, but certainly the evidence that has been published is far from conclusive.

"The Forests of Finland," a recent publication by Yrjö Ilvessalo, describes the methods and results of a comprehensive survey of all of Finland's forest land, in which the entire country was sampled by the strip method. This enormous work was carefully planned and was checked with equal care by means of statistical analyses which indicate that the probable errors in the results obtained are astonishingly low. Two tables in this volume may throw light on the question just raised.

In Table 95 there is a comparison between the present average volume per acre and the normal volume indicated by yield tables. This is given by types and age classes. The ratio between these values of course expresses the degree of normality. In Table 119 there is a similar comparison between the present and the normal annual growth per acre. The actual growth has been determined by mean sample tree methods, and the normal is taken from standard yield tables.

If understocked plots are approaching normality the ratio between the actual growth and the normal growth must be higher than the ratio between the actual volume and the normal volume. These ratios, while not stated in Mr. Ilvessalo's tables, may readily be calculated from them. The comparison (based on the broader type classification used) is as follows:

Type	Age class	Ratio of actual to normal (per cent)	
		For growth	For volume
Pine.....	1- 20	88	100
	21- 40	63	66
	41- 60	61	63
	61- 80	53	53
	81-100	56	57
	101-120	55	66
Spruce.....	1- 20	137	110
	21- 40	72	85
	41- 60	56	63
	61- 80	48	54
	81-100	48	51
	101-120	69	51
Birch.....	1- 20	94	92
	21- 40	61	70
	41- 60	62	64
	61- 80	68	62
Average.....		68	69

These figures give no support to the hypothesis that understocked stands approach normality. Out of 14 instances of understocked stands, only 4 show any evidence of an approach to normality and 9 show the opposite trend. The single overstocked stand is the only one growing faster than normal. The averages of the two columns of percentages indicate that the method of predicting growth through yield tables by assuming that the degree of normality will remain unchanged is essentially accurate in the long run.

It may be rash to draw this conclusion from these Finnish tables. It is hard to appraise the accuracy of all parts of the work described and dangerous to reason by analogy from Finland to America. The figures herewith presented raise a question rather than answer one.

A Tree Classification for the Selection Forests of the Sierra Nevada

A new tree classification for the pine forests of California that bids fair to revolutionize practices in marking timber for cutting in this region has been devised by Duncan Dunning, associate silviculturist of the California Forest Experiment Station. Observations on permanent sample plots over a period of 15 years and the analysis of 20,000 numbered trees are the bases for the new classification. Mr. Dunning holds that the classification by crown dominance, widely used by foresters, is inadequate for the all-aged pine forests of California. In its place he has set up a new thrift classification in which he divides the stand into seven classes defined by easily observed characters influencing thrift. The major characters considered are age, degree of dominance, and crown development. Confirmatory indications of relative vigor considered are form of top, color and density of foliage, character of bark, size of tree, etc. The new system gives a more definite basis for the selection of trees for marking and makes possible the checking of marking on cut-over lands.

The seven proposed classes are as follows:

Class 1.—Age class, young or thrifty mature; *position*, isolated or dominant (rarely codominant); *crown length*, 65 per cent or more of the total height; *crown width*, average or wider; *form of top*, pointed; *vigor*, good. Class 1 trees grow at the best rate and have the lowest loss-liability factor. They are the least susceptible to insect attacks. They are good seed bearers when of sufficient size. The present value of timber from such trees is comparatively low. They should practically always be retained when sound.

Class 2.—Age class, young or thrifty mature; *position*, usually codominant (rarely isolated or dominant); *crown length*, less than 65 per cent of the total height; *crown width*, average or narrower; *form of top*, pointed; *vigor*, good or moderate. Class 2 trees make fair growth, but are rather liable to loss and are poor seed bearers. They should be marked in preference to the larger class 1 trees, when there are sufficient

other thrifty trees to make up the reserve, or in thinning groups.

● *Class 3.*—*Age class*, mature; *position*, isolated or dominant (rarely codominant); *crown length*, 65 per cent or more of the total height; *crown width*, average or wider; *form of top*, round; *vigor*, moderate. Class 3 trees grow rather slowly but increase in value can be expected without great risk of loss. They are good seed bearers. The usual tendency is to retain too many trees of this type. Where sufficient class 1 trees are lacking, where good seed trees are needed, or where a second cutting must be provided for, there should be no hesitancy in leaving such trees.

Class 4.—*Age class*, mature; *position*, usually codominant (rarely isolated or dominant); *crown length*, less than 65 per cent of the total height; *crown width*, average or narrower; *form of top*, round; *vigor*, moderate or poor.

Class 5.—*Age class*, overmature; *position*, isolated or dominant (rarely codominant); *crown*, of any size; *form of top*, flat; *vigor*, poor. Usually the largest trees in the stand. Class 4 and 5 trees produce practically no growth even on the best sites. Their liability to loss is high. Their retention involves risking a large investment in high-quality timber. They should always be cut unless there are no other available seed trees.

Class 6.—*Age class*, young or thrifty mature; *position*, intermediate or suppressed; *crown*, of any size, usually small; *form of top*, round or pointed; *vigor*, moderate or poor.

Class 7.—*Age class*, mature or overmature; *position*, intermediate or suppressed; *crown*, of any size, usually small; *form of top*, flat; *vigor*, poor. Class 6 and 7 trees are usually too small to be merchantable. Class 6 trees grow fairly well and give promise of later development if released. They bear practically no seed. When merchantable, they should be cut unless relief from competition is assured. Class 7 trees are undesirable from every standpoint and should always be cut if merchantable.

Purchase of Land for National Forests Authorized

Purchase of 74,077 acres of land as additions to national forests has been authorized by the National Forest Reservation Commission as the outcome of a meeting held December 7. The expenditures thus approved amount to \$1,307,714, averaging \$17.65 per acre.

At the head of the list of proposed additions is the Waterville Valley in the White Mountains of New Hampshire. This area of 22,539 acres, embracing such scenic features as the Mad River Notch and the Greeley Ponds, includes not only extensive stands of young forest growth but merchantable timber worth more than \$1,000,000. The largest area covered by the authorization is 40,294 acres in Arkansas, the approved

purchase price of which averages \$2.87 per acre. This land, consisting for the most part of small holdings, is scattered over the mountain region of the northwestern part of the State, mainly in Garland, Hot Springs, Yell, Scott, and Perry Counties. Unusual importance is given to the proposal of national forest management for this land by the fact that this mountainous section was the source of a great proportion of the floodwaters that recently devastated the Mississippi Valley.

In Pennsylvania the commission authorized the purchase of 6,141 acres in McKean, Forest, and Warren Counties, all well-timbered lands carrying good stands of merchantable stock; in Tennessee, 1,905 acres in Sullivan, Unicoi, Monroe, and Polk Counties; in North Carolina, 1,483 acres in Macon and Swain Counties; and in West Virginia, 57 acres in Pendleton County.

With these additions, 2,966,818 acres of land in the eastern half of the United States has been purchased or is being purchased for national forest purposes.

Allegheny Forest Experiment Station Organized with Headquarters at Philadelphia

The Allegheny Forest Experiment Station is being organized with headquarters at 3438 Walnut Street, Philadelphia, Pa. Offices have been furnished by the University of Pennsylvania, which will cooperate with the United States Forest Service in the work of the station. Field work will be conducted at various centers, or branch stations, in Pennsylvania, Maryland, New Jersey, and Delaware, in cooperation with the State agricultural colleges and State forestry departments and with a number of other educational institutions and organizations.

The interest of the station will eventually extend to nearly every phase of timber growing. Although substantial progress is being made by the State forestry organizations of Pennsylvania, New Jersey, and Maryland in silvicultural as well as in fire-control studies, a great need for forest research is presented by these States. Their vast original forests of hardwoods, white pine, and hemlock, of a quality unexcelled in the United States, have practically all been cut to meet the demands for wood for use in manufacturing, mining, and agriculture. As a result of close cutting and of fires much of the 18,000,000 acres of cut-over land is reforesting very inadequately. At present the four States produce in a year about one-eighth as much lumber as they consume. The scrub oak lands of Pennsylvania and the ragged pine stands of southern New Jersey are outstanding examples of the rehabilitation problem that faces the forester in this region.

The staff of the station, headed by R. D. Forbes, formerly director of the Southern Forest Experiment Station, New Orleans, will consist at the start of seven persons.

New Increment Measuring Instrument

An increment measuring instrument invented by Duncan Dunning, of the California Forest Experiment Station, has been patented by him in behalf of the Government and people of the United States. Mr. Dunning's device provides a safe resting place for the increment core, and gives opportunity to adjust its position so as to determine a starting point from which to count rings or to measure the space occupied by a series of rings. A sliding magnifying glass similar to that used on a common slide rule is provided for use in examining indistinct or very fine rings. The instrument looks very much like a slide rule, with a groove instead of the central slide. This groove receives the core to be measured and can be adjusted to hold it firmly.

It is predicted that all those who in the past have sworn vigorously when they have dropped and broken cores will bless Dunning for his ingenuity.

Western White Pine Killed by Light Fire

The extreme sensitiveness of western white pine to fire is illustrated by the results of a light fire that occurred on the Quartz Creek area of the Kaniksu National Forest, Idaho, in July, 1926. A study of fire damage on part of this area in the summer of 1927 indicated that a considerable proportion of the white pine trees had been killed outright, but many were still green. Examination of a large number of these green trees showed that the majority were dead but were drawing some moisture from the sapwood. Losses will approximate 100 per cent of the stand. A partial explanation of the reproduction of white pine after fires which has been in part attributed to seed storage appears in the fact that many of these green but dead trees were producing seed.

Count of Western Yellow Pine Seed-Fall

A count of western yellow pine seed fallen to the ground on the Breece sale area of the Manzano National Forest, New Mexico, shows an average of 4.4 seed per square foot, the equivalent of 181,664 seed per acre. The count was made on 74 plots of 1 square foot each, in several localities, at regular time intervals. Since seed were still falling when the observations ended, it is probable that the total number of seed per acre will exceed 200,000. Studies of the Southwestern Forest Experiment Station have indicated that only about one western yellow pine seed in one thousand produces a seedling that lives to be 5 years old. If this ratio holds, three seed crops such as that observed on the Manzano will be required to produce satisfactory restocking of the cut-over land.

War Department Takes Back Military National Forests

A presidential order of December 2, 1927, revokes previous orders creating the military national forests Benning, in Georgia; Eustis, in Virginia; Meade, in Maryland; and Pine Plains, in New York. This action is due to the fact that larger areas on these tracts are now required for military use. A board consisting of two Army officers and two officers of the Forest Service has been appointed to consider the situation on the remaining military national forests.

Choctawhatchee National Forest

The Florida National Forest, recently diminished by the segregation of its eastern division as the Ocala National Forest, has been given a new name. An executive order of November 10 designates it as the Choctawhatchee National Forest.

General Forest News

Congress Appropriates for National Arboretum and Botanic Garden

Expenditure of \$300,000 to acquire land for a national arboretum in the District of Columbia is authorized by the deficiency bill signed December 22. A tract of about 400 acres on the Mount Hamilton and Hickey Hill areas, about 2 miles from the Capitol, has been chosen as the site for the development of the arboretum, the importance of which was discussed by George B. Sudworth in the Forest Worker of March, 1927.

Another item in this bill provides \$600,000 for enlarging the United States Botanic Garden, Washington, D. C.

Blister Rust Jumps Two Hundred Miles

The white pine blister rust has shown ability to jump over distances of two or three hundred miles in favorable seasons, according to data collected during the 1927 season. H. G. Lachmund, of the Bureau of Plant Industry, records the finding of spores on wild Ribes south of the international boundary of British Columbia and north of Prince George, 120 miles farther north than ever before. In the coastal region of British Columbia the disease was found more than 300 miles beyond the limits of western white pine there and 190 miles farther north than in any previous season. Its spread included the Queen Charlotte Islands, 90 miles off the mainland and a full 200 miles north and west of the northern limits of the coastal belt of

western white pine. The disease was discovered on pines near Spirit Lake in the Cascade Mountains near the mouth of the Columbia River and on Ribes near Priest River, Idaho, well within the western limits of the main commercial range of western white pine.

The seasonal spread of the disease in the West is usually greatest toward the north and east. A new theory is advanced as the probable explanation of this. The leaves of most species of Ribes develop resistance to the infection soon after, if not shortly before, they reach full size. Ribes leaves to the south may, if there is an early spring, be too far advanced to accept infection readily by the time the main production of the spores on the pines begins, whereas to the north there is always plenty of Ribes leaves at the stage of development to accept infection.

Improving Timber Growth in Northern Swamps

By RAPHAEL ZON, United States Forest Service

There are some 9,000,000 acres of swamps and swamp forests in the northern portions of Michigan, Minnesota, and Wisconsin. From a production standpoint many of the swamp forests must be classed as almost waste land. In a typical black spruce swamp, for instance, the growth is about one-tenth of a cord per acre per year. Yet the swamp forests are the only extensive virgin forests remaining in the Lake States. And they are the source of pulpwood, poles, and posts—materials that are becoming increasingly scarce.

These swamps can be made into productive forests just as hundreds of thousands of acres of such land have been made into profitable forests in Finland, Sweden, Norway, and northeastern Russia. This does not require complete drainage, but can be brought about by means of superficial ditching that sets the stagnant water into motion and removes the excess. Such drainage does not make the swamp a forest fire menace and does not make land available in advance of actual needs, but converts it almost immediately into productive forest land, improves the natural cover for wild life, and contributes to the regular feeding of the streams.

In Finland some 800,000 acres of swamp lands have been drained to improve the forest growth. In Sweden the forest service spent \$326,000 for such ameliorative works on the State forests between 1875 and 1920, and is at present expending some \$116,000 for this purpose each year. In addition, the Forest Owners' Association of Sweden, a private organization, during the decade 1911-1920 drained on an average some 36,000 acres per year.

Observations and experiments of the Lake States Forest Experiment Station have shown that in swamp forests where poor growth before drainage has been due exclusively to excess water, drainage causes an immediate increase in growth in all trees. Just as in the case of Norway spruce and pine in Europe, so in the case of our own tamarack and black spruce in northern

Minnesota, after removal of the excess water the growth in diameter is increased from $2\frac{1}{2}$ to 3 times, the growth in height from 2 to 7 times, and the growth in volume from 12 to 23 times. If normal growth of the forest stand in the swamp has been prevented not only by excess water but also by certain physical or chemical properties of the soil, the effect of the drainage is not uniform, is not shown in all trees, and does not manifest itself until after a more or less prolonged interval. The increase in growth is considerably less in deciduous trees, such as birch and aspen, than in conifers, such as spruce, pine, and tamarack. In spruce, tamarack, and other conifers the increase is influenced by the depth of the tree's roots. The more superficial the roots, the greater the increase in growth due to drainage.

The drainage of swamps makes the top soil suitable for germination of tree seeds, and so leads to the appearance of abundant young growth.

Side by side with its beneficial effect upon forest vegetation, drainage of swamps produces also an injurious effect. If the conditions in which the forest has grown up are radically changed by drainage, as the result of the drying of the peat the old trees begin gradually to die out. Another cause of the deterioration of the old trees is the settling of the peat after drainage, which exposes their roots.

Drainage of swamps for forest purposes must not be carried to extreme lengths. Although the effects are fairly well understood and extensive operations of this kind are being carried on in Europe, a number of questions remain open as to the possible results of such drainage.

An example from Sweden of the profitableness of draining swamp forests may be mentioned. A mixed pine forest about 60 years of age, located on very swampy land, was drained in 1915. Before drainage the annual growth was at the rate of 41.4 cubic feet per acre. Seven years later, in 1922, the annual growth per acre reached 159 cubic feet, an increase of 117.6 cubic feet per acre per year. The stumpage value of this timber in Sweden amounts to 5.3 cents per cubic foot. The increase in annual growth, 117.6 cubic feet, is worth \$6.23 per acre. This almost exactly covers the cost of drainage, which amounted to \$6.61 per acre. In other words, the drainage was paid for by the increase in the value of growth in the seventh year after drainage.

Accelerated tree growth in drained swamp lands of the Lake States is illustrated by a Minnesota tamarack cut in the fall of 1925. The swamp in which this tree grew was drained in 1918. The contrast in the tree's annual growth before and after drainage appears in the following figures:

	1918	1925
Age.....	49 years.....	56 years.....
Diameter.....	1.1 inches.....	2.6 inches.....
Height.....	10 feet.....	20 feet.....
Volume.....	0.036 cubic feet.....	0.379 cubic feet.....

How Pacific Coast Builders Will Fortify Against Termites

The provisions against termite damage and wood decay which the Pacific Coast Building Officials Conference recently added to its uniform building code, on the recommendation of Thomas E. Snyder and other scientists of the Department of Agriculture, are as follows:

SECTION 2511.—PROTECTION FROM TERMITES AND DECAY

(a) Timber to be used in contact with the earth shall be thoroughly impregnated by a standard pressure process with coal-tar creosote or other approved preservative except as provided in section 2204 (2). Timber should be completely framed before treatment whenever possible but when cutting after treatment is unavoidable the cut surfaces shall be thoroughly coated with coal-tar creosote or other equivalent preservative.

(b) Wood and fiber products not impregnated with an approved preservative shall not be placed in contact with the earth or within 15 inches thereof, excepting posts over a concrete floor as provided in section 2505 (a) and, in certain minor buildings, as provided in section 2204 (2).

(c) Masonry foundations and footings shall be laid in Portland cement mortar. Foundations built up of masonry units, whether hollow or solid, shall be capped below woodwork with at least 1 inch of Portland cement mortar, cement and slate, or other approved seal.

(d) In cities where buildings are subject to termite attack a termite shield shall be provided, continuing completely around the surface of the foundation below the woodwork of the building on both the inside and outside surfaces. Such shield may be formed of a strip of noncorrodible metal firmly inserted in the surface of masonry or between the foundation and the wood, with the projecting edge bent downward at an angle of 45 degrees and extending horizontally at least 2 inches from the face of the foundation.

(e) Floor sleepers or joists imbedded in masonry or concrete or laid on concrete which is in contact with the earth shall be impregnated with an approved preservative.

(f) Untreated wooden posts or columns supported by concrete floors must rest upon a metal or concrete footing projecting at least 2 inches above the finished floor.

(g) The ends of beams and girders entering masonry or concrete shall not be sealed in, but shall be provided with boxes affording an air space at the end of the piece as provided in section 2506 (e).

(h) Where there are spaces under floors near the earth they shall be excavated so that there will be no earth within 12 inches of the wood and they shall be provided with cross ventilation as specified in section 2205.

Recommendations of National Conference on Commercial Forestry

Discussion of commercial forestry at the national conference held for that purpose in November by the Chamber of Commerce of the United States led to the following conclusions:

"This conference is convinced that it is fundamental to national welfare to produce a continuously ample supply of wood upon the 470,000,000 acres of land that will be idle if not kept in forest. The business of growing timber on one-fourth of the nation's land area is on a par with agriculture as the foundation of the American economic and social structure.

"* * * To continue reforestation, to expand it to meet national and community requirements, the following measures are necessary:

"1. Adequate public protection against forest fires.

"2. Equitable and stable taxation.

"3. Full technical and economic information through research.

"4. Complete recognition by the people of State and Federal responsibility."

The conference adopted these recommendations:

"That the Clarke-McNary National Forestry Act be effectuated by immediate provision by Congress of the full amount of the annual appropriations it authorized, thus extending systematic fire protection and its other benefits throughout the country.

"That our land taxation systems be thoroughly investigated and equitably revised to the end that local public revenues shall be protected; and, at the same time, the vital public economic interest of thousands of communities in the continued productivity of vast areas of land shall be safeguarded.

"That comprehensive forestry research shall be authorized and vigorously supported by Congress, so that reforestation and wood utilization may be more intelligently directed.

"That State and Federal forest agencies whose cooperation we appreciatively recognize, shall have their hands strengthened. That recognizing their responsibility, forest land owners assume as a civic duty the leadership in this great national business enterprise already well begun."

Windbreaks Do Protect Orchards

Investigations to determine the value of windbreaks to orchards in southern California were carried on during the winter of 1926-27 under the general direction of Extension Forester Woodbridge Metcalf. A series of anemometers placed near orange orchards protected by blue gum plantations showed consistent three times as much wind movement in the unprotected as in the protected portions of the orchards. On an occasion when the anemometers in the open showed 400 miles of wind in 24 hours, those set up 300 feet in the lee of a 65-foot windbreak recorded only one-third of this total wind movement.

Slash Pine for Central Georgia

By W. R. MATTOON, United States Forest Service

Although the natural range of the slash pine in Georgia falls short of covering the southern half of the State, this tree is being grown with promise of success from 50 to 75 miles farther north. Numerous sowings made in 1919 and following years in seed beds at the State college of agriculture, at Athens, Clarke County, have shown uniformly strong, vigorous growth; the trees reaching an average height of 1 foot the first year and heights of 2 to 3 feet in two years. At Winterville, in the same county, Harry Pittard has a bed of slash pines 2 years old that have grown waist high. Some trees that were dug up in south Georgia in February, 1924, as 2-year-old seedlings about a foot high, and set out near Winterville, now range up to 9 feet in height, and in the season of 1927 made a growth of from 20 to 30 inches.

In November, 1923, Boy Scouts of Macon, Ga., sowed some slash-pine seed in spots in hard, gravelly soil on an abandoned field that is part of their camp ground. The forester in charge of the sowing did not expect the seed to grow, but intended merely to give the boys a lesson in the technique of planting. The following August not a spot could be found that did not have two or more trees growing, and some spots had as many as 20 seedlings, from 5 to 9 inches in height. By October, 1927, these trees had grown to heights of from 6 to 9 feet. Wild slash-pine stock gathered in Emanuel County, in central Georgia, and planted in March, 1924, on the same scout camp ground, has now grown into a beautiful young forest. In 1927 most of the trees, now 5 years old, grew from 20 to 30 inches and some grew as much as 36 inches. Most of the trees measure from 7 to 9 feet in height.

These plots of planted slash pine, in locations from 40 to nearly 100 miles north of the tree's natural range in Georgia, are almost equaling the rate of growth of the species in the localities where it grows naturally. Indications are promising that the slash pine will grow in the middle and lower piedmont regions of Georgia to sizes at which it can be used for turpentine and later for pulpwood, crossties, poles, and saw logs.

In one respect slash pine far outranks loblolly or shortleaf pine for use in starting plantations: It is practically immune to the attack of the tip moth, which during the year 1927 damaged from 70 to 90 per cent of all the loblolly pine planted in Clarke County, Ga., in the vicinity of the State college of agriculture. Shortleaf is known to be attacked and sometimes seriously injured by this insect.

Slash pine should be set out when one season old, for in the second season the trees get to be too large for transplanting. It should be planted on warm situations. An important caution to be observed in planting this tree north of its range is to avoid situations that are wet, frosty, or very dry.

Which Side of the Fence?

By PHILIP C. WAKELEY, United States Forest Service

The futility of attempting to reproduce longleaf pine without protection from fire and hogs, and the aggressiveness of the species under adequate protection, are convincingly shown by a small stand of 15-year-old longleaf near Henleyfield, Miss. The patch of land belongs to a thrifty negro farmer, who some 15 years ago decided to cultivate it and accordingly inclosed it with a rail fence. Since the plot adjoined some cut-over lands of a lumber company that were burned annually, the farmer plowed two furrows outside his fence to protect the rails from fire.

For some reason the land was not cropped. A few longleaf pines left by the lumber company bore cones abundantly and seeded in both the company's land and the farmer's field. Instead of turning the seedlings under the farmer left them for another season, plowing his line as before. He has them yet, a fully stocked stand of thrifty saplings, pretty as a picture, still protected by the old rail fence and the annually renewed double furrow. Any seedlings that started between the fence and the fire line were cleaned out by the hogs. Outside the line, hogs and annual fires got all but an isolated longleaf here and there, leaving the land to scanty grass and worthless brush.

S. W. Greene, director of the Coastal Plain Experiment Station, who has called attention to the stand, used a picture of it on his 1927 American Forest Week circular under the caption "Which Side of the Fence Are You On?"

Some Ribes Eradication Work in the West

The work of eradicating the cultivated black currant has been completed in Montana, Idaho, Washington, and Oregon, and two-thirds completed in California, according to a report made by Stephen N. Wyckoff of the Bureau of Plant Industry at the Western White Pine Blister Rust Conference at Portland in November. Wyckoff also announced that *Ribes petiolare*, which occurs in great numbers in stream bottoms of the white pine type and which on account of susceptibility to the blister rust is a serious menace to nearby stands of pine, can be more effectively and cheaply eradicated by chemicals than by hand pulling. The estimated saving through the use of chemicals is 35 to 50 per cent.

Satin Moth Quarantine Extended

The satin moth quarantine order of the Federal Horticultural Board which became effective November 15, 1926, has been amended to cover 88 towns in Maine, 4 in New Hampshire, and 25 in Massachusetts in addition to the territories previously designated.

Charcoal from Lodgepole Pine

At Bernice, Mont., 25 miles from Butte on the Helena highway, lodgepole pine of inferior grade from the Deerlodge National Forest feeds what are said to be the only commercial charcoal pits in the State. Oscar Carlson, who came to this country from Sweden 40 years ago, carries on the work with his son by the same methods that his own father followed in making charcoal for steel refineries in central Sweden.

In the construction of a pit a hollow triangular structure of wood is placed on the ground and 10-foot lengths of timber are piled on end around it until the pile is about 40 feet in diameter. Over the pile of wood is placed a thick layer of fir boughs, and over this a heavy layer of earth which is kept in place by a system of braces. Small flues are left open at intervals of 6 feet around the base. Then dry shavings and pieces of wood are placed in the small central opening and set on fire. When the fire has burned awhile and more dry wood has been placed on it, the top opening is blocked with wood and earth. By regulating the draughts the fire is kept so low as not actually to burn the wood. The pits are tended carefully, night and day, for from three to seven weeks, according to the size of the pile and the condition of the wood. Then the fire is drawn and water is applied to the smoldering mass. If the work has been done with proper care, Carlson says, the charred timbers stand in their original positions, retaining their annual rings and the marks of the ax.

The pits are burned each spring and fall, and at each burning yield about 270 tons of charcoal.

Eddy Station Seeks to Develop Fast-Growing Strain of Pine

The Eddy Tree Breeding Station at Placerville, Calif., is concentrating its work on the effort to develop fast-growing strains of pine and walnut. The pine is getting first attention. To find out which is the fastest growing species the station is making nursery and plantation tests of every species of pine of which seed can be obtained. Nursery plantings made in the spring of 1927 include seedlings of 49 species and 9 varieties, from seed obtained in 17 different countries. Pines of the same species grown in different localities and sites are being tested in order to find which are the fast-growing geographic forms. This method of study has so far been used chiefly with western yellow pine from British Columbia, Nebraska, and five Western States. The tests are made with seed planted in the nursery. To find in the forest individual trees of the important species of pine from which to start new strains, seed are collected and planted in the nursery and the selection of fast-growing parent trees is made on the basis of the relative growth of their progeny. To find individual planted trees with this fast-growing characteristic the

largest seedlings are picked from reforestation nurseries all over the country, shipped to the station, and planted in the arboretum where they can be given comparatively uniform conditions for growth. The most vigorous seedlings planted in the winter of 1925-26 have already shown superiority in subsequent growth over check trees rated as "normal" at the time of the plantings. The most rapid growing of these vigorous specimens grew three time as fast in height as the average "normal" tree.

In addition to the selection methods just described hand pollination is being employed to cross species in order to get hybrid vigor or combine good qualities of two or more species. Crosses are also made between geographic forms and between especially fine individuals of a species. Self-pollination is used to fix desirable characteristics that may be found, to segregate types of certain species, and to increase the accuracy of the progeny tests. Pollination work in 1927 was done with western yellow, Monterey, sugar, Jeffrey, western white, knobcone, lodgepole, and digger pines, and northern California black walnut. Pine pollination work in 1926 yielded seeds of the cross western yellow pine X Swiss mountain pine, and the cross western yellow pine X digger pine.

The Eddy Tree Breeding Station is on a tract of 65 acres, of which 40 acres are in nursery and 18 acres in arboretum. The site is near the lower edge of the western yellow pine belt in the central Sierras at an elevation of 2,700 feet. All the timber species of the lower Sierras are found in the station grounds or near by. The climate is comparatively mild and the growing season is 205 days. The soil is well adapted for a nursery and arboretum and the even topography contributes toward making conditions very much alike over the whole area.

The station staff is composed of Director Lloyd Austin, Forester John S. Barnes, Propagator H. M. Lumsden, and two assistants.

Hardwoods That Once Grew in the Yellowstone

New evidence has recently been brought to light that magnolias, sycamores, and chestnut trees once flourished in the region of the Yellowstone, where the redwood is also known to have lived. The blasting away of a ledge to widen a section of the park's loop road between Mammoth Hot Springs and Camp Roosevelt has revealed tons of rock bearing the fossil imprint of leaves and twigs of these species. The outlines are wonderfully distinct. In the opinion of Prof. H. L. Mason, of the University of California, the material of which this rock was formed accumulated about 4,000,000 years ago during a volcanic eruption that destroyed the trees and buried the leaves. From the abundance of chestnut leaves it appears that the chestnut was one of the most common trees in this prehistoric forest.

Foreign Notes

Trees Protect Canadian Pacific Tracks from Snow Drift

(From an article by B. M. WINEGAR, General Tie Agent, Canadian Pacific Railway, in the Illustrated Canadian Forest and Outdoors)

In an effort to find something less expensive than wooden fences to keep snow from drifting and piling on its tracks, the Canadian Pacific Railway began in 1916 to experiment in developing snowbreaks of trees. A 4-year trial was made with transplants of carragana (Siberian pea), laurel leaf willow, and the native conifers. It was found that carragana and laurel leaf willow, although their mortality in transplanting was low, did not retain enough branches close to the ground to afford the desired protection and were too easily broken by drifting snow. Among the native conifers the greatest promise was shown by cedar, spruce, jack pine, and Scotch pine. Scotch pine withstood transplanting best of all and offered added advantages in that it adapts itself to any kind of soil and retains its lower branches when pruned back to any height. Cedar is recommended only for the protection of a deep cut or where in level country it is supplemented by a portable fence.

The planting scheme adopted by the railway company calls for a combination of spruce with Scotch pine. The spruce is used in the front rows and the more rapidly growing Scotch pine in the rear.

As early in the season as possible, a strip of ground 10 to 12 feet wide is thoroughly plowed and harrowed. Besides preparing the soil to receive the young trees this affords fire protection. Spring planting begins as soon as the frost is entirely out of the ground and can be continued for about four weeks. In the fall, planting starts about the first of September and can be continued until heavy frost comes. Transplants 12 to 16 inches high are used. The rows of trees are spaced 4 feet apart and staggered. To replace individual trees that may die after planting a number of extra trees are planted 2 feet apart in a convenient location. The first year after planting the 12-foot strip is kept cultivated to a depth of about 3 inches by the use of a horse cultivator and, close to the trees, a hand hoe. Care is taken to keep grass, herbage, roots, or rubbish from collecting around the base of the young trees, since this would tend to kill the lower branches.

The ultimate height of the trees is limited to 10 feet or less. In order that the trees may grow bushy enough to stop drifting snow, their upward growth must be retarded before they grow to within 2 feet of the final

height desired. For example, if a snowbreak 8 feet high is required the trees are pruned when they reach a height of nearly 6 feet. Pruning is done in the first half of June. The growth of the current year on the main stem is pruned off, with the result that the top branches spread out and grow up to form new tops to the trees.

Since 1919 the Canadian Pacific has planted some 110 miles of snowbreak along sections of track that are subject to drift either because they are level with the surrounding country or because they run through cuts.

Along sections of track between Montreal and Quebec barriers of trees were planted in 1916 as a protection from drifting sand, which formerly had to be cleared from the tracks at frequent intervals. Here Carolina poplar cuttings and 2-year-old jack pine seedlings were used, the former as a background to act as a windbreak and the latter both to break the wind and hold back the sand.

Spruce Budworm Infestation Attacked by Airplane

In the summer of 1927 the Canadian Department of Agriculture made a trial of the spreading of poison dust by airplane as a method of controlling the spruce budworm. The scene of the experiment was an area near Orangedale, Cape Breton Island, where a spruce budworm infestation dating probably from 1915 reached epidemic proportions within the last four or five years. The equipment was similar to that used in dusting cotton fields of the South with boll-weevil poison. Dusting was done in the early morning usually between 4 and 7 a. m., and in the evening, because at other times the air was not sufficiently calm. It was believed, also, that the dew and the moisture in the air in early morning would cause a greater amount of the dust to stick to the needles. The plane was flown at heights of from 10 to 40 feet above the tree tops. The kinds of powder and the poundage per acre that were tried, on plots from 800 feet to 2 miles long and from 200 feet to one-quarter mile wide, are the following: Calcium arsenate, 10, 15, 20, 30; lead arsenate, 15, 30.

The main purpose of the experimental work thus begun is to determine if possible the most effective kind of poison, the most effective poundage per acre, and the lowest poundage per acre that will kill the caterpillars.

Notes on the Oxford Forestry Tour of 1927

By A. F. HOUGH, United States Forest Service

In management plans for the forests of France and Germany the present trend is toward greater elasticity. Experience has shown that working plans covering long periods of time can not in any event be followed out exactly, chiefly because of accidents such as wind damage that cause the reproduction of certain periodic blocks in advance of the planned date. Consequently more responsibility is being laid on the forest officer in charge of a given area and more dependence placed on his experience and judgement as to the treatment of his forest. This is made possible by the fact that in these countries there are many forest officers who have had long experience in producing forest crops on given areas.

Four State forests in western France that are managed under the "uniform" or shelterwood compartment system, with fixed periodic blocks, were visited by the men who participated in the continental tour of the Oxford Imperial Forestry Institute last summer. These included Rouvray in the Department of Eure, Perseigne and Belleme in the Department of Orne, and Berce in the Department of the Sarthe. On these forests management plans are applied with much less rigidity than in the past. Regulation of yield is by area and volume, annual coupes or felling areas being selected by the divisional forest officer and approved by the conservator. The yield for the next 10-year period is calculated for each periodic block through an enumeration of the growing stock. No account is taken of the increment expected during the period of cutting. Any balance from the previous period is added. A fixed annual yield is determined by dividing the total volume for the periodic block by the number of years in the period. Volume tables based on diameter and height are used in the work of estimating the yield, separate tables being prepared for each felling series or even for each compartment.

In certain State forests of Germany a more elastic system has been adopted with success. Estimates of the yield are made at intervals of 20 years and are revised after 10 years. It goes without saying that cutting is on a sustained yield basis and that very good markets exist for all forest products. The amount to be cut during each 10-year period is influenced by the growth obtained and by the desirability of maintaining or working toward a normal distribution of age classes.

On the Schifferschafts forest in Baden, Black Forest, Bavaria, Oberforstrat Stephani, having demonstrated the soundness of his knowledge of silviculture, is permitted to decide on his own initiative what part of the volume of timber to be cut within the 10-year period shall be removed in any given year and in which part of the forest the cutting shall be made.

On this forest Herr Stephani has developed an uneven-aged stand of silver fir and spruce, with a mixture of beech. His idea is to aid the larger best-formed, vigorous trees to become wind-firm and produce high increment by favoring them in his thinnings. At present there is a preponderance of the older age classes (69 per cent) owing to exploitation over large areas in the eighteenth century. Artificial reforestation began early in the nineteenth century. Reproduction comes in naturally and is obtained by different systems, e. g., the group system, the strip system, and the shelterwood compartment system.

On the whole, all the foresters with whom contacts were made are agreed as to the advisability of producing mixed rather than pure coniferous forests, for the purpose of bettering the soil and increasing yields. Examples of the introduction of an understory of beech (*Fagus sylvatica*) into forests of Scotch pine were seen in France and in the Rhine Valley forests near Darmstadt and Mannheim, as well as in Bavaria. Of course the forests of *Pinus maritima* along the French coast are purely pine.

In the oak-beech forests of central France and in the maritime pine region, reliance is placed largely on natural reproduction. Planting is resorted to only in the event of a failure or for the introduction of conifers on certain poorer sites in the French oak-beech forests. It was noted, by the way, that on poor oak sites the growth of silver fir (*Abies pectinata*) is more rapid than that of the oak and beech. There are, however, certain exceptions to the rule that natural reproduction is being relied on to a greater extent than previously. In the case of the Scotch pine forests of the Rhine Valley, established by artificial means on shifting sand and heath lands, a problem has arisen in connection with natural regeneration. This is known as the "race" problem, and is the result of the formerly little understood fact that there is such a thing as heredity in trees. In planting these forests, seed from the wind-blown, twisted coast trees of Denmark and other places along the Baltic was used, because of its cheapness. The progeny of these trees has exhibited unto the third generation the characteristic twisted form of the parents. This has necessitated expensive planting. Another reason for the practice of artificial regeneration in the Rhine Valley is the necessity for intensive use of land to support the dense population. For two years after the forest is cut potatoes are raised between the rows of planted pine seedlings.

In the Spessart oak forest, it is desired to produce a dense and fairly even-aged stand so that the trees may grow tall and straight and form narrow growth rings suitable for high-class veneer stock. Natural reproduction is not relied on to establish the thick, crowded stand required during the first 50 or 60 years of the rotation. Here a "ladder" type of sowing is used, seed spots being laid out in the form of parallel strips with connecting cross bars. Older beech trees are left to protect the young seedlings from frost, and

throughout the 300-year rotation beech is kept in the stand as a trainer to cause the oak to develop tall, straight, symmetrical boles, though several rotations of the shorter-lived beech may be required for this purpose.

Another exception to the use of natural reproduction was seen in the spruce forests of Bavaria, into which beech and silver fir must be introduced artificially, often under fence to avoid damage by deer.

Airplanes and Smoke Candles for Combating Forest Insects

In a spruce forest in Czechoslovakia visited during the past summer by Dr. L. O. Howard of the United States Bureau of Entomology, an area badly infested with the nun moth is narrowly divided from one on which the infestation has been checked. This forest consists of three separate properties, owned by the Government, a private landowner, and a neighboring city. When the proposal was made in a previous season to combat the nun moth by dusting the forest with poison through the use of an airplane, the city refused to join with the Government and the private owner in this measure. Doctor Howard found the sections that had been dusted in thriving and healthy condition. The municipal forest has been so devastated by the insect that the timber will have to be cut and sold for paper pulp at an unsatisfactory price.

A new style of chemical attack on insect pests which Doctor Howard saw being tried in Europe has been developed by chemical warfare technicians. The materials used resemble somewhat the "smoke candles" used in war time to generate a smoke screen. The fumes contain arsenic. In some places the arsenic "smokes" are set at intervals on the ground, in others they are carried through the grove or orchard on long poles by a rank of men. In either case they fill the air with a white fog that takes about an hour to settle.

Communal Forests Pay Good Dividends

Seventeen communes of the Department of the Aude, in southern France, obtained a return of 1,285,000 francs from their communal forests in 1926. The average return was 2,000 francs per hectare. The village of Montfort, with a population of 490, received 247,200 francs from its woods. These communal forests are under forest management.

A consignment of 3,000,000 feet of Russian redwood and whitewood from Archangel arrived recently at Providence, R. I., on the Norwegian freighter *Wilfred*, to be handled by the Soviet Government's New York agency.

Forestry Prizes Offered by Touring Club of France

To encourage reforestation the Touring Club of France is offering a series of prizes in medals of honor and cash. A prize valued at 5,000 francs will be given each year for outstanding work in the establishment and maintenance of plantations. Six prizes of a total value of 10,000 francs (cash and medals of honor) will be given for establishing plantations, three to communes, forestry associations, or other organizations, and three to individuals. Prizes of lesser value amounting in all to 10,000 francs will be distributed during the year at tree celebrations, forestry meetings, and other gatherings for reforestation work and for propaganda and advisory work leading to reforestation. In awarding the prizes special consideration will be given to the conditions under which the work is done, the difficulties overcome, and the usefulness of the plantations. The more important prizes will be awarded for reforestation within groups of departments designated in advance and will be rotated from one group to another.

Twisted Fiber in *Pinus Longifolia*

Sowings of *Pinus longifolia* Roxb. established in Kumaon, India, for investigations into the origin of twisted fiber were reinspected in October, 1926, by Silviculturist H. G. Champion. Mr. Champion's conclusions at that time, which harmonize with those he reached after inspecting the sowings in 1923, are stated in the *Indian Forester* as follows:

"Sowings of seed of known parentage have demonstrated clearly that spirally twisted fiber in *Pinus longifolia* in Kumaon is inherited from the parents. Seedlings of all ages up to 10 seasons (excluding one season old plants) exhibit a percentage of twisted stems and a degree of twist proportional to that of the parent crop from which they are derived. This result is obtained with protection from all the ordinary forms of damage, showing that the latter can not be the immediate cause of twists. It has also been shown that coppicing once or twice by fire or other means does not appreciably alter the proportions of straight and twisted plants.

The fund contributed toward a memorial to Sir William Schlich is to be used in establishing a forestry scholarship at Oxford University. It has been proposed that the scholarship be awarded in rotation to residents of Great Britain, the British Dominions and Colonies, and the United States. In reply to a request from the committee in charge of the memorial for suggestions from American foresters the executive council of the Society of American Foresters has suggested that the scholarship should be open only to graduates in forestry, and has stated that the plan of rotation is satisfactory and particularly generous to the United States.

Personals

Louis S. Nagler has accepted appointment as conservation director of Wisconsin.

C. J. Telford has become extension forester for the State of Illinois. During several years' service with the Natural History Survey of Illinois Mr. Telford prepared a survey map of the State showing its forests and important forest planting regions, and made an extensive study of farm woodland management the results of which have been published in several booklets. Mr. Telford was graduated from the Yale Forest School with the class of 1915.

J. G. Lee, sr., for many years head of the forestry work of the Louisiana State University, has been transferred to the university's extension department as extension lecturer in forestry. Professor Lee's successor as head of the forestry department is G. D. Marckworth, who came to the university two years ago as associate professor of forestry. Professor Marckworth holds forestry degrees from Ohio State University and the Yale Forest School, and has served with the State forestry organizations of Virginia, Texas, Tennessee, and Maryland.

Joseph A. Gibbs, junior forester in charge of the Gladwin Nursery, on the Monongahela National Forest, has accepted appointment as extension forester for Connecticut and instructor in the Connecticut Agricultural College. Mr. Gibbs is a graduate of the Colorado State College, and in 1927 received the degree of master of science in forestry from the Iowa State College.

Fred B. Merrill resigned as State forester of Kentucky on November 15 and has accepted appointment to the staff of State Forester Lufburrow, of Georgia. Mr. Merrill is now engaged in developing cooperative forest fire control activities in south Georgia. His headquarters are at Albany, Ga.

Carl P. Fatzinger has been appointed assistant State forester of Delaware. Mr. Fatzinger is a graduate of the Pennsylvania State Forest School and of the Yale Forest School.

G. H. Lentz, professor of forestry extension and director of the summer camp of the New York State College of Forestry, is on leave of absence this year. He is now working on a study of the bottomland hardwoods in the South, under a cooperative arrangement between State Forester W. R. Hine of Louisiana and the Southern Forest Experiment Station.

Arthur P. Kelley, assistant professor of botany in Rutgers University, has accepted appointment as forest ecologist at the Allegheny Forest Experiment Station, Philadelphia, Pa. Doctor Kelley was educated in the University of Pennsylvania, specializing as an undergraduate in biology and botany and later receiving the degrees of master of arts and doctor of philosophy for work in morphology, taxonomy, physiology, and ecology. After a short period of teaching in the botany department of that university he became an instructor in botany in Rutgers College in 1922. He has published many papers in the fields of ecology and soil science.

H. G. Lachmund, in charge of blister rust control work of the Bureau of Plant Industry in the Pacific Northwest, is to succeed John S. Boyce as head of the bureau's Portland, Oreg., office of forest pathology.

In memory of Frank A. Fenn the United States Geographic Board has named Fenn Mountain in the Bitterroot Range in northern Idaho. Fenn Mountain lies within the Selway National Forest, not far from the city of Kooskia. Major Fenn was superintendent of forest reserves for Idaho from June, 1901, until the Forest Service was organized, when he became supervisor of the Sawtooth National Forest. Later he was successively in charge of the Bitterroot, Clearwater, Selway, and Flathead National Forests, and from 1915 to 1920 he served as assistant district forester of the northern national forest district.

Don M. Matthews has joined the faculty of the School of Forestry and Conservation, University of Michigan, as professor of forest management. He retains a consulting connection with the Tropical Plant Research Foundation and with the United Fruit Co.

George F. Rupp, a member of the 1926 class of the Yale Forest School, has left the faculty of the forestry department of the Pennsylvania State College to teach forestry in the University of the South, Sewanee, Tenn. He is succeeded by Claude E. Sutton, formerly a forest examiner on the Lolo National Forest.

Dr. L. O. Howard has retired as chief of the United States Bureau of Entomology, after 33 years of service in that position. He is succeeded by Dr. C. L. Markwardt, who for the past five years has been associate chief in charge of the regulatory work of the bureau, and also chairman of the Federal Horticultural Board. Doctor Howard remains a member of the bureau but will hereafter devote himself entirely to research.

I. T. Worthley has resigned as assistant forester of the Pennsylvania Railroad, after serving in that capacity for 15 years, and will engage in research and consultant work at Phoenixville, Pa. He is succeeded by A. P. Wood, who, since graduation from the Yale Forest School in 1920, has been employed by the railroad as a forest inspector.

Samuel J. Record, professor of forest products in the Yale Forest School, has been appointed research associate in wood technology in the department of botany, Field Museum of Natural History. Professor Record expects to spend a month of his summer vacation at the museum, as he did last year, assisting in the installation and rearrangement of wood exhibits.

L. G. Schnur, junior forester on the Sitgreaves National Forest, has been transferred to the Allegheny Forest Experiment Station, Philadelphia, Pa. Mr. Schnur is a member of the 1926 class of the Yale Forest School.

P. M. Barr has been placed in charge of the research work of the forestry organization of British Columbia, succeeding J. L. Alexander, now assistant professor of forestry at the University of Washington. Mr. Barr is at present enrolled in the Yale Forest School as a candidate for the degree of doctor of philosophy.

Charles H. Flory, district forester of the Alaska National Forest District, has been designated by the Secretary of Agriculture as a commissioner for Alaska, under the recent act of Congress that authorizes the Secretaries of the Interior, Agriculture, and Commerce each to designate an employee of his department stationed in Alaska as an ex officio commissioner.

Recently elected officers of the North Carolina Forestry Association are C. J. Harris, Dillsboro, president; R. B. Robertson, Canton, vice president; R. W. Graeber, Statesville, secretary; W. J. Damtoft, Canton, treasurer; and Joseph Hyde Pratt, Chapel Hill, chairman of executive committee.

Bibliography

New Reference Book of Forest Statistics

In "American Forests and Forest Products," Department of Agriculture Statistical Bulletin No. 21, the Forest Service has assembled on 320 pages the statistics for which it has the most frequent calls from foresters, economists, Federal and State officials, and other inquirers. Hundreds of tables are presented under the following group headings: (1) Forest statistics of the United States; (2) national lumber tables; (3) State tables of lumber production; (4) lumber production of principal kinds of wood; (5) pulpwood, wood pulp, and paper statistics; and (6) minor forest products and wood preservation. The statistics given are based on data collected by the Forest Service, the Bureau of the Census, the Bureau of Foreign and Domestic Commerce, the Bureau of Agricultural Economics, and other organizations.

Tables on State lumber production in all but four of the States were newly compiled for this publication. The showing of lumber production by kinds of wood, covering 13 of the most important woods, is the first such compilation that has been published, so far as is known by the Forest Service.

An important new feature of this bulletin is that it presents a cumulative record. Sections 2, 3, 4, and 5, in particular, not only give figures for present conditions but make an exhibit of Government records on their subjects as far back as the records extend.

Copies of this bulletin can be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 45 cents each.

Report on Study of Selective Logging in the Lake States

An advance report on the study of the comparative advantages of selective and clear cutting on four operations in the northern hemlock-hardwood forest of the Lake States has been published cooperatively by the Northern Hemlock and Hardwood Manufacturers' Association and the United States Forest Service. The study was made by Raphael Zon and R. D. Garver of the Forest Service.

The report brings out strikingly the advantages of cutting only the larger trees. For the operation studied the highest profit per 1,000 board feet was obtained when trees were cut to a diameter limit of 18 inches. Cutting to this diameter limit leaves 41 per cent of the original volume of timber standing and provides for a second cut of large timber within a reasonable time. Even if the desire is to remove in one logging all merchantable timber it does not pay to cut trees below 12 inches in diameter; for below that limit money is lost on the operation. It is not recommended that the operator cling to a rigid diameter limit, but rather that the diameter limit be used as a guide and judgment used in cutting above or below it on the basis of soundness and form of the timber, danger from windfall, and the needs of the young growth. Selective logging takes the greatest value from the stand with the least volume, and in large measures solves the problem of the small log.

The advance report outlines the method and result of the study and gives tables of costs, overrun, lumber grades obtained, effects of cutting to different diameter limits, comparative value of timber at different diameter limits, and value of logs of different sizes and species.

A few copies of this report are available for free distribution and may be obtained from the Director, Lake States Forest Experiment Station, St. Paul, Minn.

Illinois Tree Guide is Popular

A new edition of 10,000 copies of "Forest Trees of Illinois: How to Know Them" is being distributed by the Illinois Department of Conservation. The first edition, of the same number, was exhausted within a few weeks of its appearance in the past summer. The booklet was immediately adopted by the University of Illinois for use by the departments of botany and landscape engineering. Large numbers of copies were requested by colleges, high schools, and grade schools, and by clubs and county agricultural agents. A Chicago information bureau and a Chicago newspaper asked for 1,000 copies apiece, and a nursery company wanted several thousand to distribute among its customers.

This tree guide booklet, prepared by W. R. Mattoon, extension forester of the United States Forest Service, and R. B. Miller, State forester of Illinois, is the fourteenth sister in the family of State tree guide booklets that have been written by Mr. Mattoon either alone or with local collaboration. The States for which guides have been published are Connecticut, Delaware, Maryland, the District of Columbia, Virginia, North Carolina, South Carolina, Georgia, Florida, Illinois, Kentucky, Tennessee, Arkansas, and Mississippi.

Map of Mississippi Basin Published by Geological Survey

A base map of the Mississippi River basin suitable for use in showing plans for flood control has been prepared by the Geological Survey, Department of the Interior. The map covers a region about 900 miles long and 600 miles wide, extending from Dubuque to the Gulf and from beyond Omaha, Tulsa, and Houston on the west to Chicago, Evansville, and Tuscaloosa on the east. The scale is approximately 16 miles to the inch. Copies of the map may be obtained from the Geological Survey, Washington, D. C., at 50 cents each.

Topographic Map of the Grand Canyon

A topographic map of the Grand Canyon National Park, Ariz., has been prepared by the Geological Survey in cooperation with the National Park Service. Drawn on a scale of about three-fourths of a mile to the inch, the map is 43 by 80 inches in size, and it is printed in three colors. Copies are sold by the Geological Survey, Washington, D. C., at 50 cents apiece.

Timber Growing in the Western White Pine and Larch-Fir Forests of the Northern Rocky Mountains

"Timber Growing and Logging Practice in the Western White Pine and Larch-Fir Forests of the Northern Rocky Mountains" has been published by the United States Forest Service as the fourth bulletin in a series dealing with the principal forest regions of the United States. On the basis of several years' study the authors, Elers Koch and R. N. Cunningham, predict that if logging in northern Idaho and western Montana continues at the present rate the lumber production of this region will be greatly curtailed within 30 years. Whether the resultant setback will be permanent, they say, depends on what sort of treatment is given to the remaining stands and the areas that have been cut or burned over. The measure most necessary for keeping forest lands in this white pine and larch-fir region productive is adequate protection from fire, and protection from fire is largely a matter of slash disposal. Recommendations are made as to methods of disposing of slash of each of the two forest types, and as to other measures for fire protection. Attention is drawn to the value of the second-growth timber from 10 to 40 years old that now covers large areas in north Idaho and to the potential value of the timber of less desired species which the loggers now leave in the woods, both of which are now imperiled by frequent fires. As an additional means of insuring future timber supplies, selective cutting of mature trees is advocated for uneven-aged stands; and for even-aged white pine stands, leaving from two to six sound and thrifty seed trees per acre.

Copies of this publication, Department of Agriculture Bulletin 1494-D, may be obtained without charge so long as the supply lasts by writing to the Forest Service, Washington, D. C.

New British Journal

The recently organized Society of Foresters of Great Britain has published the first number of its journal, under the title "Forestry." It is intended that this journal shall carry the results of practice and research in both timber growing and utilization. The 1927 number includes 16 articles and 7 reviews, and is 130 pages in length. The editor is H. M. Steven, Imperial Forestry Institute, Oxford.



The Louisiana Department of Conservation has resumed publication of the Louisiana Conservation News, discontinued in January, 1925. The "News" reappears as a printed magazine of 16 pages. Its purpose is to help the six divisions of the department keep up with the news of each other's work and to carry this news to interested persons and organizations both in Louisiana and elsewhere.

Western White Pine Yield and Volume Tables

Yield and volume tables for the western white pine type in the Northern Rocky Mountain Region, prepared by I. T. Haig, assistant silviculturist of the Northern Rocky Mountain Forest Experiment Station, have been mimeographed for preliminary distribution. With the 34 tables are included a method for the application of normal yield tables and a site classification chart for western white pine stands. Second-growth volume tables are given for western white pine and the associated species. The yield tables indicate the possible yield in board feet and cubic feet by site indices for stands from 20 to 160 years of age. In addition the average diameter, number of trees, and basal area are given for stands of various ages.

These tables indicate that the second-growth western white pine stands on the best sites produce more than 1,000 board feet per acre per year. One outgrowth of the study on which these tables are based is the discovery that within a small margin of error the yields of individual western white pines are practically unaffected by the constituency of the stand, provided that white pine forms as much as 15 per cent of the total number of trees on the area.

A limited number of copies of this report are available to the public. Requests should be addressed to the Director, Northern Rocky Mountain Forest Experiment Station, Missoula, Mont.

A Picture Book on European Forestry

An attractive booklet containing 132 well reproduced photographs has just been issued by Nelson Courtland Brown of the New York State College of Forestry under the title "Camera Studies in European Forestry Practice." A short explanatory comment or legend accompanies each photograph. There is no text; the pictures tell the story. It is a pleasure to look over the pamphlet, and almost anyone can pick up interesting information without effort by a study of the pictures and legends. Those wishing to obtain copies should address Professor Brown at Syracuse, N. Y.

Practical Suggestions on the Care of Shade Trees

In a 4-page leaflet entitled "The Care of Shade Trees: Cultivating, Watering, Fertilizing," City Forester O. C. Charlton of Dallas, Tex., tells property owners how to care for street trees planted for them by the city park department. Explaining that "with perhaps no exception, every street shade tree has a hard time," he gives simple directions, illustrated with diagrams, for supplying the trees with the necessities of life.

Second Edition of Forestry Handbook for Teachers

"The Forest: A Handbook for Teachers," Department of Agriculture Miscellaneous Circular 98, is now in its second edition of 10,000 copies. It is being sold by the Superintendent of Documents, Government Printing Office, at 30 cents per copy and at \$37.50 per 500 copies. Several States have bought 500 copies apiece, for use in schools, and one State bought 2,000. The Northern Hemlock and Hardwood Manufacturers Association ordered 1,000 copies for distribution to teachers and schools in Wisconsin. State Forester J. S. Holmes, of North Carolina, has written to every high school in the State offering to supply a copy without charge.

Recent Books and Pamphlets

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Recent Publications of the Forest Service

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- National Forest Administrative Maps: $\frac{1}{4}$ -inch, California, Bitterroot, Gallatin, Mono, and Stanislaus; $\frac{1}{2}$ -inch, Shasta, Lolo, Natural Bridge.
- National Forest Atlas Folio, on scale of 1 inch=1 mile, Lolo.